[Time: Three Hours]   **[Marks:80]**

N.B.   1   Question **ONE** is compulsory

2   Attempt any **THREE** questions out of the remaining

3   Figure to the right indicate full marks

4   Illustrate answers with sketches wherever required and Diagram at appropriate

places carries marks

5   Assume suitable data if necessary and indicate it clearly.

1   Write short notes on any **four**.   (20)

(a)   Flange faces.

(b)   Essential accessories of floating roof tank.

(c)   Significance of baffles in Agitation. Draw different types of baffles.

(d)   Supports for horizontal vessel.

(e)   Design Pressure and Design temperature.

2   (a)   Design a pressure vessel for the following specifications: (14)
i) Shell

Internal Diameter = 1000 mm

Material = Stainless steel (SS 304)

Permissible stress for SS at 150^0 C = 130 N/mm^2

Design pressure = 0.5 N/mm^2

ii) Head (Standard Torispherical)

Crown Radius = 1000 mm

Knuckle radius = 6 % of Crown radius

Material = Stainless steel (SS 304)

iii) Flange, Gasket and bolt data:

Gasket factor = 2.0

Minimum design gasket seating stress = 11.2 N/mm^2

Flange material = asbestos

Permissible stress for bolt material = 55 N/mm^2

Bolt size M 20

Design should consist of the following:

i) Shell   ii) Head and iii) Flanges with gasket and bolt.

(b)   Draw the different formed head.   (06)

3   (a)   Write a design procedure for agitator vessel which includes: (14)
i) Agitator shaft ii) Blade assembly iii) Stuffing box

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(b) Draw a proportionate drawing of stuffing box with label. (06)

4 (a) A cylindrical storage tank with conical roof and flat bottom has following (14)
data:

Tank Diameter = 24 m
Tank Height = 16 m
Material of construction = Steel (IS : 2041)
Density of Liquid = 0.001 kg/cm^3
Density of material = 7.7 gm/cc
Superimposed load = 1225 N/m^2
Permissible stress = 140N/mm^2
Design: 1 Shell plate thickness at various height
2 Conical roof.

(b) Estimate the optimum pipe diameter for a water flowrate of 12 Kg/sec at (06)
20^{0}C. Carbon steel pipe is used. Density of water is 995 Kg/m^3 and
viscosity of water is at 20^{0}C is 1.1 x 10^{-3} Ns/m^2. Also find weather flow is
laminar or turbulent.

5 (a) Describe the design procedure for reaction vessel with- (14)
1. Plain Jacket
2. Dimple Jacket
3. Half Coil Jacket

(b) Describe the various theories of failure. (06)

6 Write short notes on any **four**. (20)
(a) Standards, codes and their significance.
(b) Radiographic examination.
(c) Classification of reaction vessel.
(d) Stress concentration.
(e) Brackets supports.

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